

SIEMENS



SIMATIC

S7-1500

Digitaleingabemodul DI 16x24VDC HF (6ES7521-1BH00-0AB0)

Gerätehandbuch

Ausgabe

07/2014

Answers for industry.

SIEMENS

SIMATIC

S7-1500/ET 200MP

Digitaleingabemodul DI 16x24VDC HF (6ES7521-1BH00-0AB0)

Gerätehandbuch

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Rechtliche Hinweise

Warnhinweiskonzept

Dieses Handbuch enthält Hinweise, die Sie zu Ihrer persönlichen Sicherheit sowie zur Vermeidung von Sachschäden beachten müssen. Die Hinweise zu Ihrer persönlichen Sicherheit sind durch ein Warndreieck hervorgehoben, Hinweise zu alleinigen Sachschäden stehen ohne Warndreieck. Je nach Gefährdungsstufe werden die Warnhinweise in abnehmender Reihenfolge wie folgt dargestellt.

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Beachten Sie Folgendes:

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Wir haben den Inhalt der Druckschrift auf Übereinstimmung mit der beschriebenen Hard- und Software geprüft. Dennoch können Abweichungen nicht ausgeschlossen werden, so dass wir für die vollständige Übereinstimmung keine Gewähr übernehmen. Die Angaben in dieser Druckschrift werden regelmäßig überprüft, notwendige Korrekturen sind in den nachfolgenden Auflagen enthalten.

Vorwort

Zweck der Dokumentation

Das vorliegende Gerätehandbuch ergänzt die Systemhandbücher:

- Automatisierungssystem S7-1500
- Dezentrales Peripheriesystem ET 200MP

Funktionen, welche die Systeme generell betreffen, sind in diesen Systemhandbüchern beschrieben.

Die Informationen des vorliegenden Gerätehandbuchs und der System-/Funktionshandbücher ermöglichen es Ihnen, die Systeme in Betrieb zu nehmen.

Änderungen gegenüber der Vorgängerversion

Gegenüber der Vorgängerversion enthält das vorliegende Gerätehandbuch folgende Änderungen:

- Modul integriert im Hardware-Katalog STEP 7 (TIA Portal) ab V13, Update 3 mit den Funktionen:
 - Modulinternes Shared Input (MSI) für Shared Device
 - Konfigurierbare Submodule z. B. für Shared Device
- Anhang Open Source Software ergänzt

Konventionen

Wenn im Folgenden von "CPU" gesprochen wird, dann gilt diese Bezeichnung sowohl für Zentralbaugruppen des Automatisierungssystems S7-1500 als auch für Interfacemodule des Dezentralen Peripheriesystems ET 200MP.

Beachten Sie auch die folgendermaßen gekennzeichneten Hinweise:

Hinweis

Ein Hinweis enthält wichtige Informationen zum in der Dokumentation beschriebenen Produkt, zur Handhabung des Produkts oder zu dem Teil der Dokumentation, auf den besonders aufmerksam gemacht werden soll.

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Siemens bietet Produkte und Lösungen mit Industrial Security-Funktionen an, die den sicheren Betrieb von Anlagen, Lösungen, Maschinen, Geräten und/oder Netzwerken unterstützen. Sie sind wichtige Komponenten in einem ganzheitlichen Industrial Security-Konzept. Die Produkte und Lösungen von Siemens werden unter diesem Gesichtspunkt ständig weiterentwickelt. Siemens empfiehlt, sich unbedingt regelmäßig über Produkt-Updates zu informieren.

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Um stets über Produkt-Updates informiert zu sein, melden Sie sich für unseren produktspezifischen Newsletter an. Weitere Informationen hierzu finden Sie unter (<http://support.automation.siemens.com>).

Open Source Software

In der Firmware des beschriebenen Produkts wird Open Source Software eingesetzt. Die Open Source Software wird unentgeltlich überlassen. Wir haften für das beschriebene Produkt einschließlich der darin enthaltenen Open Source Software entsprechend den für das Produkt gültigen Bestimmungen. Jegliche Haftung für die Nutzung der Open Source Software über den von uns für unser Produkt vorgesehenen Programmablauf hinaus sowie jegliche Haftung für Mängel, die durch Änderungen der Software verursacht werden, ist ausgeschlossen.

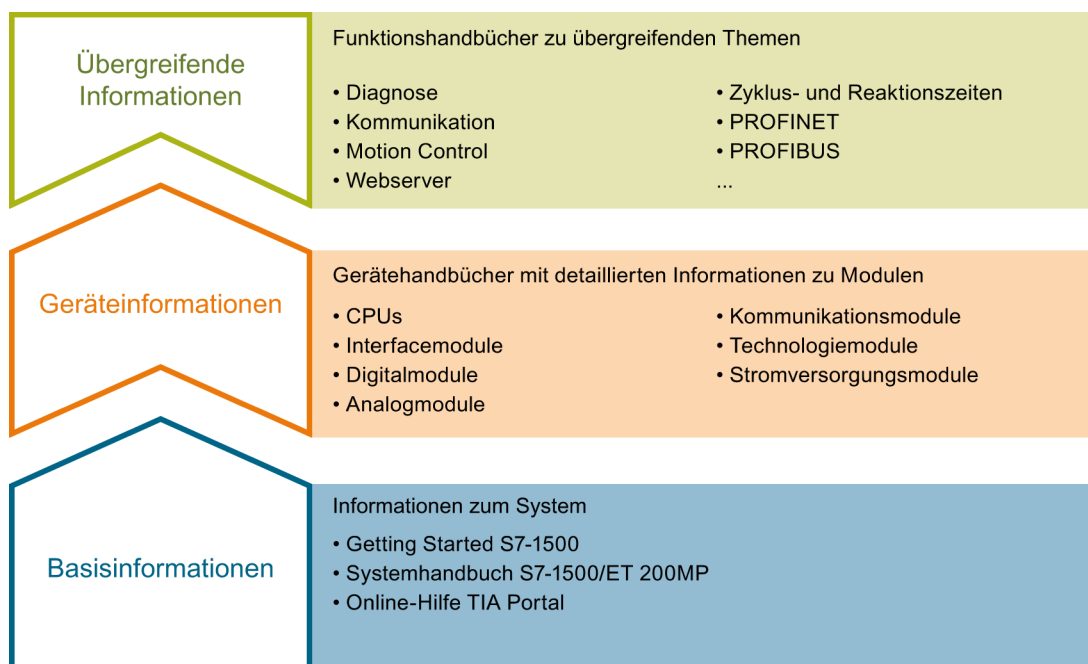
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Wegweiser Dokumentation

Die Dokumentation für das Automatisierungssystem SIMATIC S7-1500 und das Dezentrale Peripheriesystem SIMATIC ET 200MP gliedert sich in drei Bereiche.
Die Aufteilung bietet Ihnen die Möglichkeit gezielt auf die gewünschten Inhalte zuzugreifen.



Basisinformationen

Systemhandbuch und Getting Started beschreiben ausführlich die Projektierung, Montage, Verdrahtung und Inbetriebnahme der Systeme SIMATIC S7-1500 und ET 200MP. Die Online-Hilfe von STEP 7 unterstützt Sie bei der Projektierung und Programmierung.

Geräteinformationen

Gerätehandbücher enthalten eine kompakte Beschreibung der modulspezifischen Informationen, wie Eigenschaften, Anschlussbilder, Kennlinien, Technische Daten.

Übergreifende Informationen

In den Funktionshandbüchern finden Sie ausführliche Beschreibungen zu übergreifenden Themen rund um die Systeme SIMATIC S7-1500 und ET 200MP, z. B. Diagnose, Kommunikation, Motion Control, Webserver.

Die Dokumentation finden Sie zum kostenlosen Download im Internet (<http://www.automation.siemens.com/mcms/industrial-automation-systems-simatic/de/handbuchuebersicht/tech-dok-controller/Seiten/Default.aspx>).

Änderungen und Ergänzungen zu den Handbüchern werden in einer Produktinformation dokumentiert.

Manual Collection S7-1500 / ET 200MP

Die Manual Collection beinhaltet die vollständige Dokumentation zum Automatisierungssystem SIMATIC S7-1500 und dem Dezentralen Peripheriesystem ET 200MP zusammengefasst in einer Datei.

Sie finden die Manual Collection im Internet
(<http://support.automation.siemens.com/WW/view/de/86140384>).

My Documentation Manager

Mit dem My Documentation Manager kombinieren Sie ganze Handbücher oder nur Teile daraus zu Ihrem eigenen Handbuch.
Sie können das Handbuch als PDF-Datei oder in einem nachbearbeitbaren Format exportieren.

Sie finden den My Documentation Manager im Internet
(<http://support.automation.siemens.com/WW/view/de/38715968>).

Applikationen & Tools

Applikationen & Tools unterstützen Sie mit verschiedenen Tools und Beispielen bei der Lösung Ihrer Automatisierungsaufgaben. Dabei werden Lösungen im Zusammenspiel mehrerer Komponenten im System dargestellt - losgelöst von der Fokussierung auf einzelne Produkte.

Sie finden Applikationen & Tools im Internet
(<http://support.automation.siemens.com/WW/view/de/20208582>).

CAX-Download-Manager

Mit dem CAX-Download-Manager greifen Sie auf aktuelle Produktdaten für Ihr CAX- oder CAE-System zu.

Mit wenigen Klicks konfigurieren Sie Ihr eigenes Download-Paket.

Sie können dabei wählen:

- Produktbilder, 2D-Maßbilder, 3D-Modelle, Geräteschaltpläne, EPLAN-Makrodateien
- Handbücher, Kennlinien, Bedienungsanleitungen, Zertifikate
- Produktstammdaten

Sie finden den CAX-Download-Manager im Internet
(<http://support.automation.siemens.com/WW/view/de/42455541>).

Produktübersicht

2.1 Eigenschaften

Artikelnummer:

6ES7521-1BH00-0AB0

Ansicht des Moduls

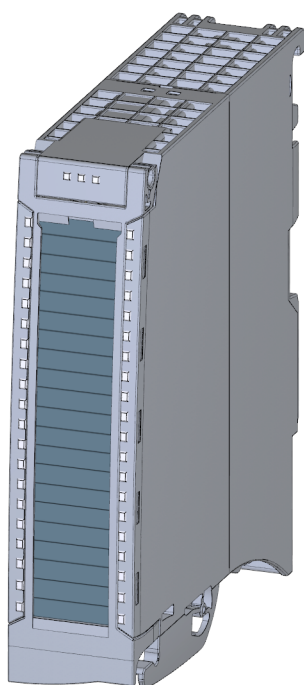


Bild 2-1 Ansicht des Moduls DI 16x24VDC HF

Eigenschaften

Das Modul hat folgende technische Eigenschaften:

- 16 Digitaleingänge, potenzialgetrennt in Gruppen zu 16
- Eingangsnennspannung DC 24 V
- Parametrierbare Eingangsverzögerung: 0,05 ms ... 20 ms
- Parametrierbare Diagnose (je Kanal)
- Parametrierbarer Prozessalarm (je Kanal)
- Geeignet für Schalter und 2-/3-/4-Draht-Näherungsschalter

Das Modul unterstützt folgende Funktionen:

Tabelle 2- 1 Versionsabhängigkeiten der Funktionen des Moduls

Funktion	Firmware-Version des Moduls	Projektierungs-Software	
		STEP 7 (TIA Portal)	GSD-Datei in STEP 7 (TIA Portal) ab V12 oder STEP 7 ab V5.5 SP3
Firmware-Update	ab V1.0.0	ab V12	X
Identifikationsdaten I&M0 bis I&M3	ab V1.0.0	ab V12	X
Uparametrieren im RUN	ab V1.0.0	ab V12	X
Taktsynchroner Betrieb	ab V1.0.0	ab V12	---
Modulinternes Shared Input (MSI)	ab V2.0.0	ab V13, Update 3 (nur PROFINET IO)	X (nur PROFINET IO)
Konfigurierbare Submodule / Submodule für Shared Device	ab V2.0.0	ab V13, Update 3 (nur PROFINET IO)	X (nur PROFINET IO)
Projektierbar hinter dem Interfacemodul IM 155-5 DP ST	ab V2.0.0	ab V13	X

Das Modul können Sie mit STEP 7 (TIA Portal) und mit GSD-Datei projektieren.

Zubehör

Folgendes Zubehör wird mit dem Modul geliefert und ist auch als Ersatzteil bestellbar:

- Beschriftungsstreifen
- U-Verbinder
- Universelle Fronttür

Weitere Komponenten

Folgende Komponente ist separat zu bestellen:

Frontstecker inkl. Potenzialbrücken und Kabelbinder

Weitere Informationen zum Zubehör finden Sie im Systemhandbuch

Automatisierungssystem S7-1500

(<http://support.automation.siemens.com/WW/view/de/59191792>) und im Systemhandbuch

Dezentrales Peripheriesystem ET 200MP

(<http://support.automation.siemens.com/WW/view/de/59193214>).

Anschließen

In diesem Kapitel finden Sie das Prinzipschaltbild des Moduls und verschiedene Anschlussmöglichkeiten.

Informationen zum Frontstecker verdrahten, Leitungsschirm herstellen, etc., finden Sie im Systemhandbuch Automatisierungssystem S7-1500 (<http://support.automation.siemens.com/WW/view/de/59191792>) und im Systemhandbuch Dezentrales Peripheriesystem ET 200MP (<http://support.automation.siemens.com/WW/view/de/59193214>) im Kapitel Anschließen.

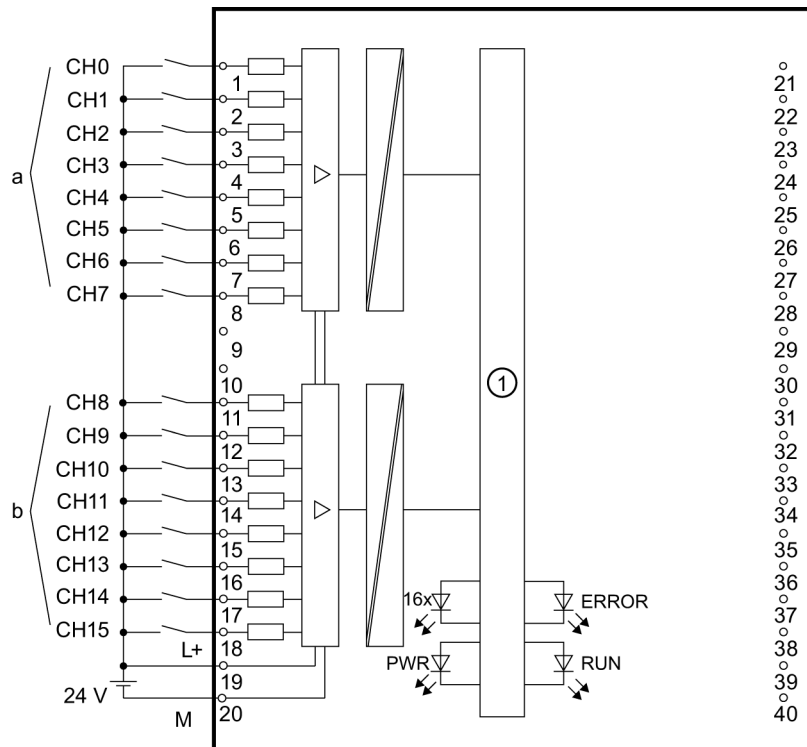
Verwendete Abkürzungen

In den folgenden Bildern bedeuten die verwendeten Abkürzungen:

L+	Anschluss für Versorgungsspannung
M	Anschluss für Masse
CHx	Kanal bzw. Anzeige für Kanalstatus
PWR	Anzeige für Versorgungsspannung (POWER)

Anschluss- und Prinzipschaltbild

Das folgende Bild zeigt, wie Sie das Modul anschließen und die Zuordnung der Kanäle zu den Adressen (Eingangsbyte a und Eingangsbyte b).



① Rückwandbusanschlusung

Bild 3-1 Prinzipschaltbild und Anschlussbelegung

Widerstandsbeschaltung der Geber

Zur Erkennung eines Drahtbruchs ist es erforderlich, dass auch bei geöffneten Geberkontakten ein ausreichender Ruhestrom fließt. Beschalten Sie deshalb die Geberkontakte mit einem Widerstand von 25 k Ω ... 45 k Ω mit 0,25 W.

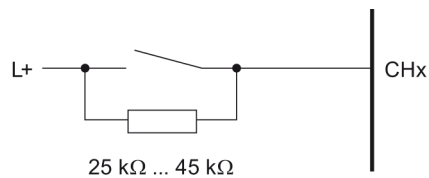


Bild 3-2 Widerstandsbeschaltung der Geber

Tipp: Verwendung der Potenzialbrücken

Wenn Sie die Versorgungsspannung DC 24 V zu einem benachbarten Modul weiterschleifen wollen, dann verwenden Sie die zum Frontstecker mitgelieferten Potenzialbrücken. Sie vermeiden so, dass Sie eine Klemmstelle mit zwei Adern verdrahten müssen.

Gehen Sie wie folgt vor:

1. Speisen Sie die Versorgungsspannung DC 24 V an den Klemmen 19 und 20 ein.
2. Stecken Sie die Potenzialbrücken zwischen die Klemmen 19 und 39 (L+) und zwischen die Klemmen 20 und 40 (M).
3. Nutzen Sie die Klemmen 39 und 40, um das Potenzial zum nächsten Modul weiterzuschleifen

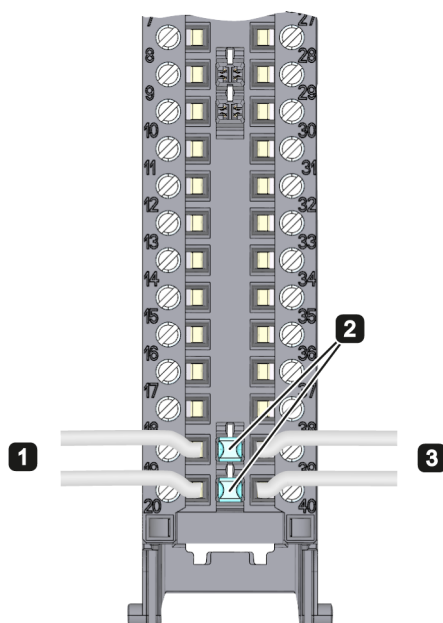


Bild 3-3 Verwendung der Potenzialbrücken

Hinweis

Bitte beachten Sie, dass die max. Stromtragfähigkeit 8 A pro Potenzialbrücke nicht überschritten werden darf!

Parameter/Adressraum

4.1 Parameter

Parameter des DI 16x24VDC HF

Bei der Parametrierung des Moduls mit STEP 7 legen Sie die Eigenschaften des Moduls über verschiedene Parameter fest. Die einstellbaren Parameter finden Sie in der nachfolgenden Tabelle. Der Wirkungsbereich der einstellbaren Parameter ist abhängig von der Art der Projektierung. Folgende Projektierungen sind möglich:

- Zentraler Betrieb mit einer S7-1500 CPU
- Dezentraler Betrieb am PROFINET IO in einem ET 200MP System
- Dezentraler Betrieb mit PROFIBUS DP in einem ET 200MP System

Bei der Parametrierung im Anwenderprogramm werden die Parameter mit der Anweisung WRREC (Umparametrieren im RUN) über Datensätze an das Modul übertragen, siehe Kapitel Parametrierung und Aufbau der Parameterdatensätze (Seite 31)

Tabelle 4- 1 Einstellbare Parameter und deren Voreinstellung

Parameter	Wertebereich	Vorein- stellung	Umpara- metrieren im RUN	Wirkungsbereich mit Projektierungs- Software z. B. STEP 7 (TIA-Portal)	
				GSD-Datei PROFINET IO	GSD-Datei PROFIBUS DP
Diagnose					
• Fehlende Versorgungsspannung L+	Ja/Nein	Nein	Ja	Kanal*	Kanalgruppe**
• Drahtbruch	Ja/Nein	Nein	Ja	Kanal	Kanalgruppe**
Eingangsverzögerung	0,05 ms, 0,1 ms, 0,4 ms, 1,6 ms, 3,2 ms, 12,8 ms, 20 ms	3,2 ms; im takt- syn- chronen Betrieb 0,05 ms (nicht änderbar)	Ja	Kanal	Kanalgruppe**

Parameter	Wertebereich	Voreinstellung	Umparametrieren im RUN	Wirkungsbereich mit Projektierungs-Software z. B. STEP 7 (TIA-Portal)	
				GSD-Datei PROFINET IO	GSD-Datei PROFIBUS DP
Prozessalarm					
• steigende Flanke	Ja/Nein	Nein	Ja	Kanal	Kanal
• fallende Flanke	Ja/Nein	Nein	Ja	Kanal	Kanal
• steigende und fallende Flanke	Ja/Nein	Nein	Ja	Kanal	Kanal

* Wenn Sie die Diagnose für mehrere Kanäle freigeben, erhalten Sie bei Ausfall der Versorgungsspannung einen Meldeschwall, weil jeder freigegebene Kanal diesen Fehler erkennt.

Sie können diesen Meldeschwall vermeiden, indem Sie die Diagnose nur für einen Kanal freigeben.

** Beim Umparametrieren im RUN ist der Wirkungsbereich je Kanal einstellbar.

4.2 Adressraum

Das Modul kann in STEP 7 unterschiedlich konfiguriert werden, siehe nachfolgende Tabelle. Je nach Konfiguration werden zusätzliche/unterschiedliche Adressen im Prozessabbild der Eingänge belegt.

Die Buchstaben "a bis d" sind auf dem Modul aufgedruckt. "EB a" steht z. B. für Modul-Anfangsadresse Eingangsbyte a.

Konfigurationsmöglichkeiten des DI 16x24VDC HF

Das Modul können Sie mit STEP 7 (TIA Portal) oder mit GSD-Datei projektieren.

Wenn Sie das Modul über GSD-Datei projektieren, dann finden Sie die Konfigurationen unter verschiedenen Kurzbezeichnungen/Modulnamen.

Folgende Konfigurationen sind möglich:

Tabelle 4- 2 Konfigurationsmöglichkeiten

Konfiguration	Kurzbezeichnung/ Modulname in der GSD-Datei	Projektierungs-Software z. B. mit STEP 7 (TIA Portal)	
		Integriert im Hardware Katalog STEP 7 (TIA Portal)	GSD-Datei in STEP 7 (TIA Portal) ab V12 oder STEP 7 ab V5.5 SP3
1 x 16-kanalig ohne Wertstatus	DI 16x24VDC HF	ab V12	X
1 x 16-kanalig mit Wertstatus	DI 16x24VDC HF QI	ab V12	X
2 x 8-kanalig ohne Wertstatus	DI 16x24VDC HF S	ab V13, Update 3 (nur PROFINET IO)	X (nur PROFINET IO)
2 x 8-kanalig mit Wertstatus	DI 16x24VDC HF QI S	ab V13, Update 3 (nur PROFINET IO)	X (nur PROFINET IO)
1 x 16-kanalig mit Wertstatus für Modul- internes Shared Input mit bis zu 4 Sub- modulen	DI 16x24VDC HF MSI	ab V13, Update 3 (nur PROFINET IO)	X (nur PROFINET IO)

Wertstatus (Quality Information, QI)

Bei folgenden Modulnamen ist der Wertstatus immer aktiviert:

- DI 16x24VDC HF QI,
- DI 16x24VDC HF QI S
- DI 16x24VDC HF MSI

Jedem Kanal ist ein zusätzliches Bit für den Wertstatus zugeordnet. Das Bit für den Wertstatus gibt an, ob der eingelesene Digitalwert gültig ist. (0 = Wert ist fehlerhaft).

Adressraum bei Konfiguration als 16-kanaliges DI 16x24VDC HF

Das folgende Bild zeigt die Belegung des Adressraums bei der Konfiguration als 32-kanaliges Modul mit Wertstatus. Für das Modul können Sie die Anfangsadresse frei vergeben. Die Adressen der Kanäle ergeben sich aus der Anfangsadresse.

Belegung im Prozessabbild der Eingänge (PAE)

	7	6	5	4	3	2	1	0	Eingangswert:
EB a	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Kanal 0 bis 7 (Eingang CH0 bis CH7)
	15							8	
EB b (=a+1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Kanal 8 bis 15 (Eingang CH8 bis CH15)

	7	6	5	4	3	2	1	0	(QI) Wertstatus
EB (=a+4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Kanal 0 bis 7 (Wertstatus QI0 bis QI7)
	15							8	
EB (=a+5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Kanal 8 bis 15 (Wertstatus QI8 bis QI15)

0 = eingelesener Wert am Kanal ist fehlerhaft

Bild 4-1 Adressraum bei Konfiguration als 16-kanaliges DI 16x24VDC HF mit Wertstatus

Adressraum bei Konfiguration als 2 x 8-kanaliges DI 16x24VDC HF QI S

Bei der Konfiguration als 2 x 8-kanaliges Modul werden die Kanäle des Moduls in mehrere Submodule aufgeteilt. Diese Submodule können beim Einsatz des Moduls in einem Shared Device unterschiedlichen IO-Controllern zugewiesen werden.

Die Anzahl der nutzbaren Submodule ist abhängig von dem eingesetzten Interfacemodul. Beachten Sie die Hinweise im jeweiligen Gerätehandbuch des Interfacemoduls.

Im Unterschied zur Konfiguration 1 x 16-kanaliges Modul hat jedes der zwei Submodule eine frei vergebare Anfangsadresse.

Belegung im Prozessabbild der Eingänge (PAE)

		Eingangswert:	
	7 6 5 4 3 2 1 0		
EB a	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Kanal 0 bis 7 (Eingang CH0 bis CH7)	1. Submodul
	15 8		
EB b	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Kanal 8 bis 15 (Eingang CH8 bis CH15)	2. Submodul

(QI) Wertstatus

	7 6 5 4 3 2 1 0		
EB (=a+1)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Kanal 0 bis 7 (Wertstatus QI0 bis QI7)	1. Submodul
	15 8		
EB (=b+1)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Kanal 8 bis 15 (Wertstatus QI8 bis QI15)	2. Submodul

0 = eingelesener Wert am Kanal ist fehlerhaft

Bild 4-2 Adressraum bei Konfiguration als 2 x 8-kanaliges DI 16x24VDC HF QI S

Adressraum bei Konfiguration als 1 x 16-kanaliges DI 16x24VDC HF MSI

Bei der Konfiguration 1 x 16-kanaliges Modul (Modulinternes Shared Input, MSI) werden die Kanäle 0 bis 15 des Moduls in bis zu 4 Submodule kopiert. Die Kanäle 0 bis 15 sind dann mit identischen Eingangswerten in verschiedenen Submodulen vorhanden. Diese Submodule können beim Einsatz des Moduls in einem Shared Device bis zu vier IO-Controllern zugewiesen werden. Jeder IO-Controller kann auf dieselben Kanäle lesend zugreifen.

Die Anzahl der nutzbaren Submodule ist abhängig von dem eingesetzten Interfacemodul. Bitte beachten Sie die Hinweise im jeweiligen Gerätehandbuch des Interfacemoduls.

Wertstatus (Quality Information, QI)

Die Bedeutung des Wertstatus hängt davon ab, um welches Submodul es sich handelt.

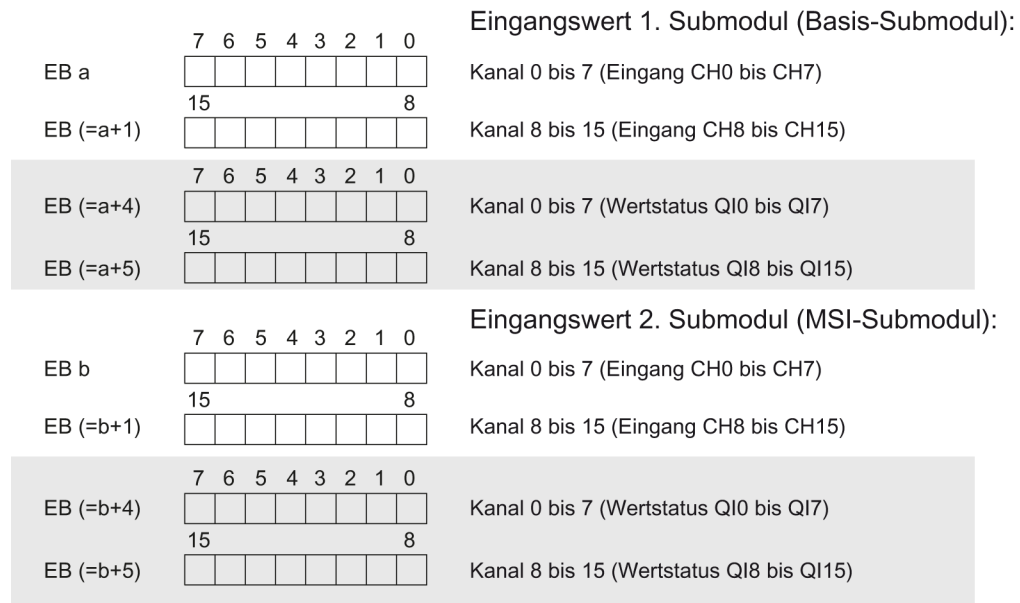
Beim 1. Submodul (=Basis-Submodul) zeigt der Wertstatus 0 an, dass der Wert fehlerhaft ist.

Beim 2. bis 4. Submodul (=MSI-Submodul) zeigt der Wertstatus 0 an, dass der Wert fehlerhaft ist oder dass das Basis-Submodul noch nicht parametrisiert ist (nicht betriebsbereit).

4.2 Adressraum

Das folgende Bild zeigt die Belegung des Adressraums mit Submodul 1 und 2 und dem Wertstatus.

Belegung im Prozessabbild der Eingänge (PAE) für 1. und 2. Submodul

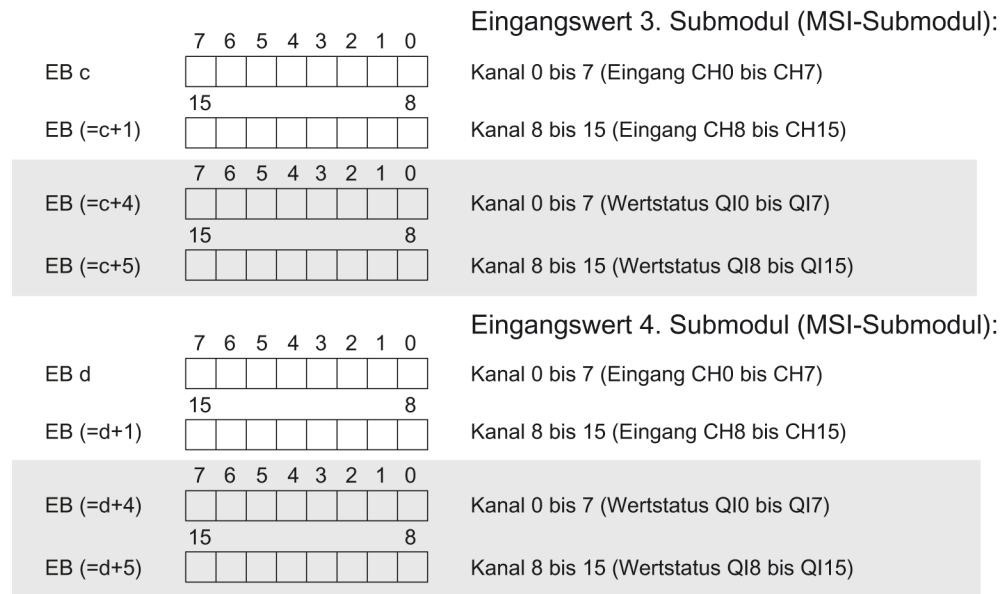


0 = eingelesener Wert am Kanal ist fehlerhaft

Bild 4-3 Adressraum bei Konfiguration als 1 x 16-kanaliges DI 16x24VDC HF MSI

Das folgende Bild zeigt die Belegung des Adressraums mit Submodul 3 und 4 und dem Wertstatus.

Belegung im Prozessabbild der Eingänge (PAE) für 3. und 4. Submodul



0 = eingelesener Wert am Kanal ist fehlerhaft

Bild 4-4 Adressraum bei Konfiguration als 1 x 16-kanaliges DI 16x24VDC HF MSI

Alarmer/Diagnosemeldungen

5.1 Status- und Fehleranzeigen

LED-Anzeigen

Im folgenden Bild sehen Sie die LED-Anzeigen (Status- und Fehleranzeigen) des DI 16x24VDC HF.

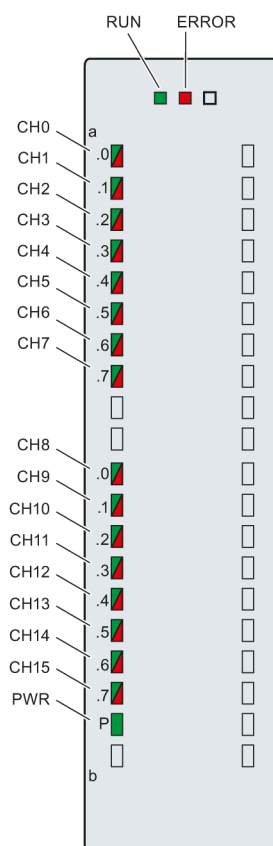












Bild 5-1 LED-Anzeigen des Moduls DI 16x24VDC HF

Bedeutung der LED-Anzeigen

In den nachfolgenden Tabellen finden Sie die Bedeutung der Status- und Fehleranzeigen erläutert. Abhilfemaßnahmen für Diagnosemeldungen finden Sie im Kapitel Diagnosemeldungen (Seite 24).



LED RUN und ERROR

Tabelle 5- 1 Status- und Fehleranzeigen RUN und ERROR

LED		Bedeutung	Abhilfe
RUN	ERROR		
 aus	 aus	Keine oder zu geringe Spannung am Rückwandbus	<ul style="list-style-type: none"> • Schalten Sie die CPU und/oder die Systemstromversorgungsmodule ein. • Überprüfen Sie, ob die U-Verbinder gesteckt sind. • Überprüfen Sie, ob zu viele Module gesteckt sind.
 blinkt	 aus	Modul läuft an und blinkt bis zur gültigen Parametrierung.	---
 ein	 aus	Modul ist parametrierung	
 ein	 blinkt	Zeigt Modulfehler an (mindestens an einem Kanal liegt ein Fehler vor, z. B. Drahtbruch).	Werten Sie die Diagnose aus und beseitigen Sie den Fehler (z. B. Drahtbruch).
 blinkt	 blinkt	Hardware defekt	Tauschen Sie das Modul aus.




LED PWR

Tabelle 5- 2 Statusanzeige PWR

LED PWR	Bedeutung	Abhilfe
 aus	Versorgungsspannung L+ zu niedrig oder fehlt	Versorgungsspannung L+ prüfen.
 ein	Versorgungsspannung L+ liegt an und ist OK	---

LED CHx

Tabelle 5- 3 Statusanzeige CHx

LED CHx	Bedeutung	Abhilfe
 aus	0 = Status des Eingangssignals	---
 ein	1 = Status des Eingangssignals	---
 ein	Diagnose: Drahtbruch	Verdrahtung prüfen. Bei einfachen Schaltern Diagnose deaktivieren oder Geberkontakte mit einem Widerstand (25 kΩ ... 45 kΩ) beschalten.
	Versorgungsspannung L+ zu niedrig oder fehlt	Versorgungsspannung L+ prüfen.

5.2 Alarmer

Das Digitaleingabemodul DI 16x24VDC HF unterstützt Diagnosealarm und Prozessalarm.

Diagnosealarm

Bei folgenden Ereignissen erzeugt das Modul einen Diagnosealarm:

- Fehlende Versorgungsspannung L+
- Drahtbruch

Prozessalarm

Bei folgenden Ereignissen erzeugt das Modul einen Prozessalarm:

- Steigende Flanke
- Fallende Flanke
- Steigende und fallende Flanke

Detaillierte Informationen zum Fehlerereignis erhalten Sie im Prozessalarm-Organisationsbaustein mit der Anweisung "RALRM" (Alarmzusatzinfo lesen) und in der Online-Hilfe von STEP 7.

Welcher Kanal des Moduls den Prozessalarm ausgelöst hat, wird in der Startinformation des Organisationsbausteins eingetragen. In dem folgenden Bild finden Sie die Zuordnung zu den Bits des Lokaldaten-Doppelworts 8.

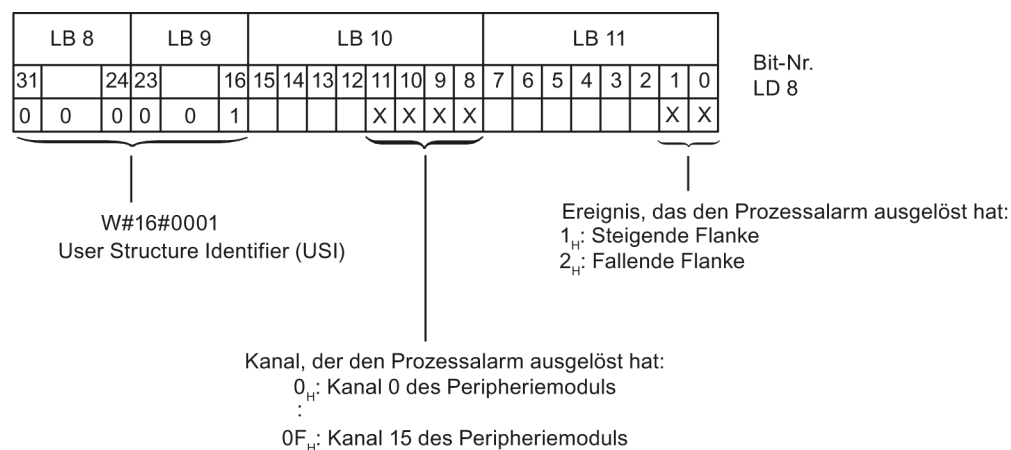


Bild 5-2 Startinformation des Organisationsbausteins

Aufbau der Alarmzusatzinfo

Tabelle 5- 4 Aufbau der USI = W#16#0001

Name des Datenblocks	Inhalt	Bemerkung	Bytes
USI (User Structure Identifier)	W#16#0001	Alarmzusatzinfo der Prozessalarme des Peripheriemoduls	2
Es folgt der Kanal, der den Prozessalarm ausgelöst hat.			
Kanal	B#16#00 bis B#16#0F	Nummer des Kanals, der das Ereignis auslöst (Kanal 0 bis Kanal 15 des Moduls)	1
Es folgt das Fehlerereignis, das den Prozessalarm ausgelöst hat.			
Ereignis	B#16#01	Steigende Flanke	1
	B#16#02	Fallende Flanke	

5.3 Diagnosemeldungen

Diagnosemeldungen

Zu jedem Diagnoseereignis wird eine Diagnosemeldung ausgegeben und am Modul blinkt die ERROR-LED. Die Diagnosemeldungen können z. B. im Diagnosepuffer der CPU ausgelesen werden. Die Fehlercodes können Sie über das Anwenderprogramm auswerten.

Wenn das Modul dezentral mit PROFIBUS DP in einem ET 200MP System betrieben wird, dann haben Sie die Möglichkeit, Diagnosedaten mit der Anweisung RDREC bzw. RD_REC über Datensatz 0 und 1 auszulesen. Den Aufbau der Datensätze finden Sie im Internet im "Gerätehandbuch zum Interfacemodul IM 155-5 DP ST (6ES7155-5BA00-0AB0)".

Tabelle 5- 5 Diagnosemeldungen, deren Bedeutung und Abhilfemaßnahmen

Diagnosemeldung	Fehlercode	Bedeutung	Abhilfemaßnahmen
Drahtbruch	6 _H	Geberbeschaltung ist zu hochohmig	anderen Gebertyp einsetzen oder anders verdrahten, z. B. Leitungen mit höherem Querschnitt verwenden
		Unterbrechung der Leitung zwischen Modul und Sensor	Leitungsverbindung herstellen
		Kanal nicht beschaltet (offen)	<ul style="list-style-type: none"> Diagnose deaktivieren Geberkontakte mit einem Widerstand von 25 kΩ ... 45 kΩ beschalten
Lastspannung fehlt	11 _H	Versorgungsspannung L+ des Moduls fehlt	Versorgungsspannung L+ dem Modul/Kanal zuführen
Prozessalarm verlor	16 _H	Modul kann keinen Alarm absetzen, da der vorhergehende Alarm nicht quittiert wurde; möglicher Projektierungsfehler	<ul style="list-style-type: none"> Alarmbearbeitung in der CPU ändern und ggf. Modul neu parametrieren. Fehler bleibt bestehen, bis Modul mit neuen Parametern versorgt wird

Technische Daten

Technische Daten des DI 16x24VDC HF

	6ES7521-1BH00-0AB0
Produkttyp-Bezeichnung	DI 16x24VDC HF
Allgemeine Informationen	
HW-Erzeugnisstand	E01
Firmware-Version	V2.0.0
Produktfunktion	
I&M-Daten	Ja; IM0 bis IM3
Engineering mit	
STEP 7 TIA-Portal projektierbar/integriert ab Version	V12.0 / V12.0
STEP 7 projektierbar/integriert ab Version	ab V5.5 SP3 / -
Betriebsart	
MSI	Ja
Versorgungsspannung	
Spannungsart der Versorgungsspannung	DC
Nennwert (DC)	24 V
zulässiger Bereich, untere Grenze (DC)	20,4 V
zulässiger Bereich, obere Grenze (DC)	28,8 V
Verpolschutz	Ja
Eingangsstrom	
Stromaufnahme, max.	20 mA; (bei Versorgung mit DC 24 V)
Leistung	
Leistungsentnahme aus dem Rückwandbus	1,1 W
Verlustleistung	
Verlustleistung, typ.	2,6 W
Digitaleingaben	
Anzahl der Eingänge	16
m/p-lesend	p-lesend
Eingangskennlinie nach IEC 61131, Typ 3	Ja
Eingangsspannung	
Art der Eingangsspannung	DC
Nennwert, DC	24 V
für Signal "0"	-30 bis +5 V
für Signal "1"	11 bis 30 V
Zulässige Spannung am Eingang, max.	30 V
Zulässige Spannung am Eingang, min.	-30 V

	6ES7521-1BH00-0AB0
Eingangsstrom	
für Signal "1", typ.	2,5 mA
Eingangsverzögerung (bei Nennwert der Eingangsspannung)	
für Standardeingänge	
• parametrierbar	Ja; 0,05 / 0,1 / 0,4 / 1,6 / 3,2 / 12,8 / 20ms
• bei "0" nach "1", min.	0,05 ms
• bei "0" nach "1", max.	20 ms
• bei "1" nach "0", min.	0,05 ms
• bei "1" nach "0", max.	20 ms
für Alarmeingänge	
• parametrierbar	Ja
Leitungslänge	
Leitungslänge geschirmt, max.	1000 m
Leitungslänge ungeschirmt, max.	600 m
Geber	
Anschließbare Geber	
2-Draht-Sensor	Ja
• zulässiger Ruhestrom (2-Draht-Sensor), max.	1,5 mA
Taktsynchronität	
Taktsynchroner Betrieb (Applikation bis Klemme synchronisiert)	Ja
Filter- und Verarbeitungszeit (TWE), min.	80 µs; bei 50 µs Filterzeit
Buszykluszeit (TDP), min.	250 µs
Alarmer/ Diagnosen/ Statusinformationen	
Alarmer	
Diagnosealarm	Ja
Prozessalarm	Ja
Diagnosemeldungen	
Diagnose	Ja
Überwachung der Versorgungsspannung	Ja
Drahtbruch	Ja; auf I < 350 µA
Kurzschluss	Nein
Sicherungsfall	Nein
Diagnoseanzeige LED	
RUN-LED	Ja; grüne LED
ERROR-LED	Ja; rote LED
Überwachung der Versorgungsspannung	Ja; grüne LED
Kanalstatusanzeige	Ja; grüne LED
für Kanaldiagnose	Ja; rote LED
für Moduldiagnose	Ja; rote LED

	6ES7521-1BH00-0AB0
Potenzialtrennung	
Potenzialtrennung Kanäle	
zwischen den Kanälen	Nein
zwischen den Kanälen, in Gruppen zu	16
zwischen den Kanälen und dem Rückwandbus	Ja
zwischen den Kanälen und der Versorgungsspannung der Elektronik	Nein
Zulässige Potentialdifferenz	
zwischen verschiedenen Stromkreisen	DC 75 V / AC 60 V (Basisisolation)
Isolation	
Isolation geprüft mit	DC 707 V (Type Test)
Dezentraler Betrieb	
Priorisierter Hochlauf	Ja
Maße	
Breite	35 mm
Höhe	147 mm
Tiefe	129 mm
Gewichte	
Gewicht, ca.	240 g

Toleranzen der parametrierbaren Eingangsverzögerung

Tabelle 6- 1 Toleranzen der parametrierbaren Eingangsverzögerung

Eingangsverzögerung	Toleranzbereich
0,05 ms	43 µs bis 57 µs
0,1 ms	86 µs bis 114 µs
0,4 ms	344 µs bis 456 µs
1,6 ms	1,5 ms bis 1,9 ms
3,2 ms (voreingestellt)	3 ms bis 4 ms
12,8 ms	12 ms bis 15 ms
20 ms	19 ms bis 23 ms

Maßbild

A

In diesem Anhang finden Sie das Maßbild des Moduls montiert auf einer Profilschiene, sowie ein Maßbild mit geöffneter Frontklappe. Die Maße müssen Sie bei der Montage in Schränken, Schalträumen usw., berücksichtigen.

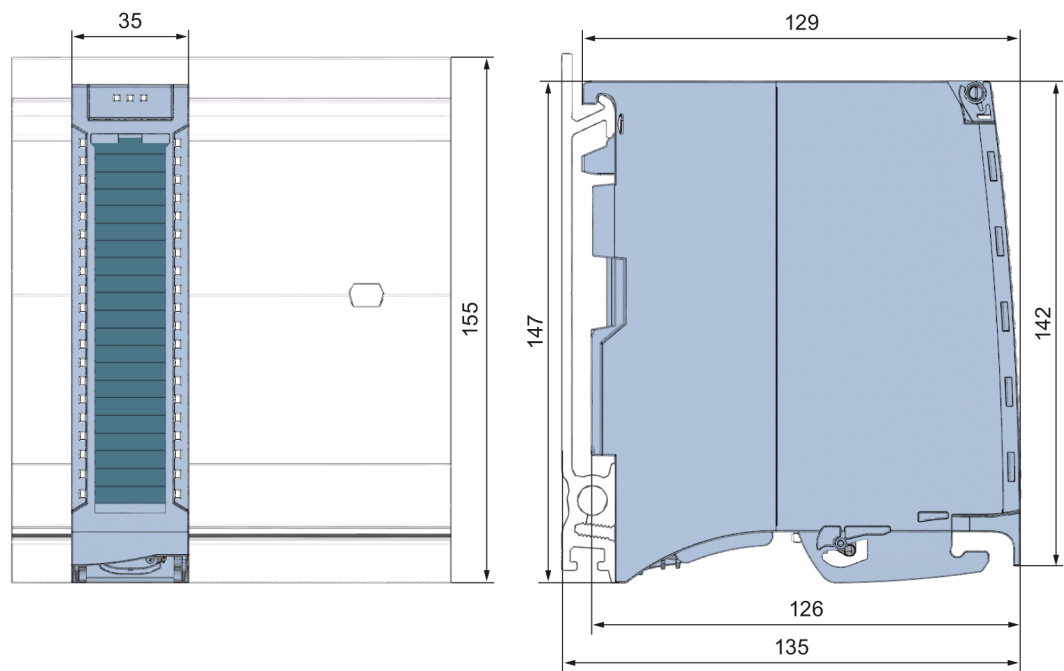


Bild A-1 Maßbild des Moduls DI 16x24VDC HF

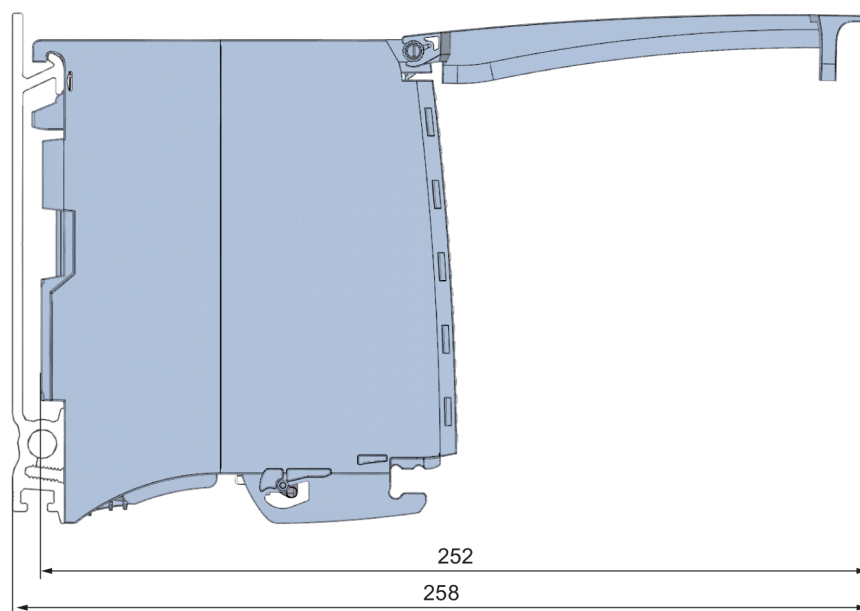


Bild A-2 Maßbild des Moduls DI 16x24VDC HF in Seitenansicht mit geöffneter Frontklappe

Parameterdatensätze

B.1 Parametrierung und Aufbau der Parameterdatensätze

Die Datensätze des Moduls haben einen identischen Aufbau - unabhängig davon, ob Sie das Modul mit PROFIBUS DP oder PROFINET IO projektieren.

Abhängigkeiten bei der Projektierung mit GSD-Datei

Bei der Projektierung des Moduls mit GSD-Datei können Abhängigkeiten beim "Einstellen der Parameter" entstehen.

Bei diesem Modul gibt es keine Abhängigkeiten. Sie können die einzelnen Parameter beliebig miteinander kombinieren.

Parametrierung im Anwenderprogramm

Sie haben die Möglichkeit das Modul im RUN umzuparametrieren, (z. B. Werte für Eingangsverzögerung einzelner Kanäle können geändert werden, ohne dass dies Rückwirkungen auf die übrigen Kanäle hat).

Parameter ändern im RUN

Die Parameter werden mit der Anweisung WRREC über die Datensätze 0 bis 15 an das Modul übertragen. Dabei werden die mit STEP 7 eingestellten Parameter in der CPU nicht geändert, d. h. nach einem Anlauf sind wieder die mit STEP 7 eingestellten Parameter gültig.

Die Parameter werden erst nach dem Übertragen von dem Modul auf Plausibilität geprüft.

Ausgangsparemeter STATUS

Wenn bei der Übertragung der Parameter mit der Anweisung WRREC Fehler auftreten, dann arbeitet das Modul mit der bisherigen Parametrierung weiter. Der Ausgangsparemeter STATUS enthält aber einen entsprechenden Fehlercode.

Die Beschreibung der Anweisung WRREC und der Fehlercodes finden Sie in der Online-Hilfe von STEP 7.

Betrieb des Moduls hinter einem Interfacemodul PROFIBUS-DP

Beim Betrieb des Moduls hinter einer IM PROFIBUS-DP sind die Parameterdatensätze 0 und 1 nicht rücklesbar. Bei den rückgelesenen Parameterdatensätzen 0 und 1 erhalten Sie die Diagnosedatensätze 0 und 1. Weitere Informationen finden Sie im Gerätehandbuch zum Interfacemodul PROFIBUS-DP, Kapitel Alarime im Internet (<http://support.automation.siemens.com/WW/view/de/78324181>).

Zuordnung Datensatz und Kanal

Bei der Konfiguration 1 x 16-kanalig stehen die Parameter in den Datensätzen 0 bis 15 und sind wie folgt zugeordnet:

- Datensatz 0 für Kanal 0
- Datensatz 1 für Kanal 1
- ...
- Datensatz 14 für Kanal 14
- Datensatz 15 für Kanal 15

Bei der Konfiguration 2 x 8-kanalig hat das Modul 2 Submodule mit je acht Kanälen. Die Parameter für die Kanäle stehen in den Datensätzen 0 bis 7 und sind wie folgt zugeordnet:

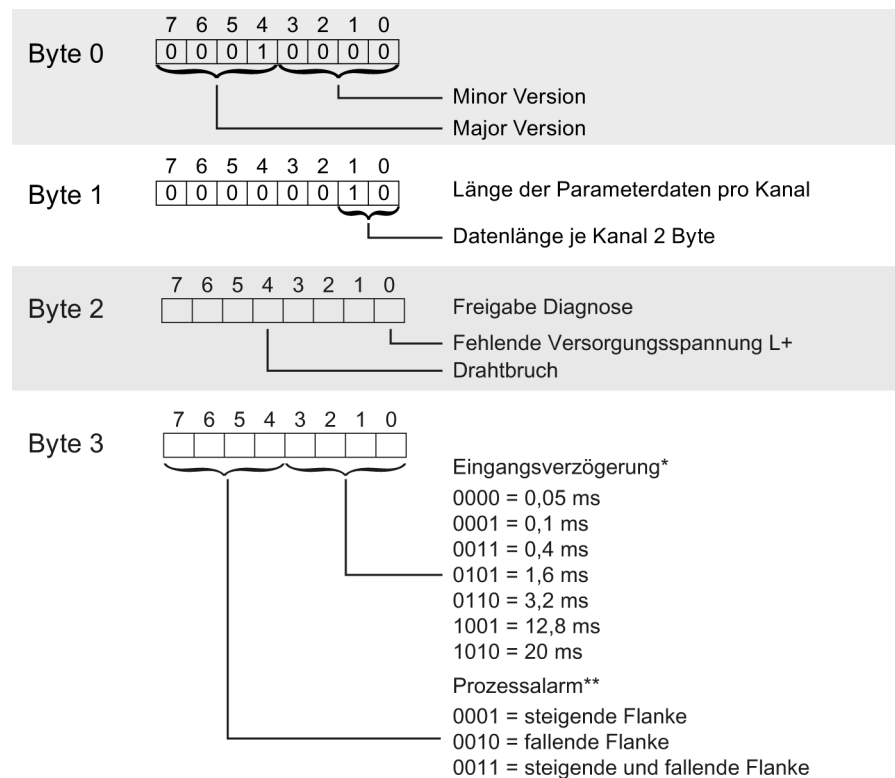
- Datensatz 0 bis 7 für Kanal 0 bis 7 (Submodul 1)
- Datensatz 0 bis 7 für Kanal 8 bis 15 (Submodul 2)

Bei der Datensatzübertragung ist das jeweilige Submodul zu adressieren.

Aufbau eines Datensatzes

Das folgende Bild zeigt Ihnen exemplarisch den Aufbau von Datensatz 0 für Kanal 0. Für die Kanäle 1 bis 15 ist der Aufbau identisch. Die Werte in Byte 0 und Byte 1 sind fest und dürfen nicht verändert werden.

Sie aktivieren einen Parameter, indem Sie das entsprechende Bit auf "1" setzen.



* Im taktsynchronen Betrieb 0,05 ms (nicht änderbar)

** Das Aktivieren der Prozessalarme über Datensatz ist nur möglich, wenn in STEP 7 dem Kanal ein Prozessalarm-OB zugeordnet ist

Bild B-1 Aufbau von Datensatz 0: Byte 0 bis 3

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